What Is Claimed Is:

1. A device for coupling in ultrasonic waves into a medium via a boundary surface, having at least one ultrasonic-wave transducer unit, which couples ultrasonic waves into said medium via a coupling medium provided between the ultrasonic-wave-generating unit and said boundary surface,
wherein the ultrasonic waves generated by said ultrasonic transducer unit being directed into a closed volume, which is provided with at least a first opening and a second opening,
a flow of gas, which ensures an overpressure inside said closed volume and simultaneously represents said coupling medium, being directed into the interior of said volume through said first opening, and
said second opening, through which a flow of gas coming from inside said volume exits, directly facing said boundary surface.

2. The device according to claim 1,
wherein said closed volume being bordered by a housing in which said ultrasonic transducer is insertable or integrated in such a manner that the ultrasonic waves are directed at said opening directly facing said boundary surface.

3. The device according to claim 1 or 2,
wherein said flow of gas being air, preferably compressed air.

4. The device according to one of the claims 1 to 3,
wherein a compressed-air line being connected to said first opening.

5. The device according to one of the claims 2 to 4,
wherein said housing having a surface, which is provided with at least said second opening, facing said boundary surface.

6. The device according to claim 5,
wherein said housing in which said surface facing said boundary surface being provided with a third opening at which the ultrasonic waves are directed by corresponding alignment of said ultrasonic transducer unit.

Sub A2 7. The device according to one of the claims 1 to 6,
wherein sound-conducting means for deflecting and/or concentrating ultrasonic waves being provided inside said closed volume.

8. The device according to claim 7,
wherein said sound-conducting means being plane elements, such as baffle plates, which separate a first spatial zone inside said closed volume, in which ultrasonic waves can propagate for the most part without the interference by gas flows, and a second spatial zone in which said gas flow is directed.

Sub A3 9. The device according to claim 7 or 8,
wherein a funnel-shaped sound-conducting means being provided which leads said ultrasonic waves from said ultrasonic transducer to an opening in such a manner that said ultrasonic waves pass through said opening as unimpeded as possible by the gas flow.

10. The device according to one of the claims 5 to 9,
wherein said flow of gas passing through said opening facing said boundary surface flowing between the upper side of said housing facing said boundary surface and said boundary surface flowing radially in relation to said opening to the outside, with an vacuum developing which draws said housing toward said boundary surface to such a degree until a kind of gas cushion is created having a thickness at which the forces of attraction being created by said vacuum and the immanent forces of repulsion present due to the mass impulse of the flow of gas between said housing and said boundary surface are in equilibrium.

11. The device according to one of the claims 1 to 10,
wherein two ultrasonic transducers, preferably a transmitter transducer and a receiver transducer, being provided.

12. The device according to one of the claims 1 to 11,
wherein said medium into which the ultrasonic waves couple in being a solid body.

13. The device according to one of the claims 1 to 12,
wherein said medium into which the ultrasonic waves couple in being biological tissue.